## U.S.ENVIRONMENTAL PROTECTION AGENCY NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY 540 S. MORRIS AVE., MONTGOMERY, AL 36115 AM ANALYSES

#### REPORT OF SAMPLE DELIVERY GROUP #1000029

Project:

Smokey Mountain Smelter, Knoxville, TN

Analysis Procedure:

Total Pages in Report:

Actinides (Americium-241) by Extraction Chromatography

Report ID:

1000029-AM

Report Type:

Original 11/18/2010

Date Reported:

0.5

#### **SAMPLES**

| NAREL<br>Sample # | Client Sample ID | Туре  | Matrix | Date<br>Collected | Date<br>Received |
|-------------------|------------------|-------|--------|-------------------|------------------|
| B0.07995U         | 03377 5-7 CM     | SAM - | SOIL   | 09/09/2010        | 09/17/2010       |
| B0.07996V         | 03378 5-7 CM     | SAM   | SOIL   | 09/09/2010        | 09/17/2010       |
| B0.07997W         | 03379 5-7 CM     | SAM   | SOIL   | 09/09/2010        | 09/17/2010       |
| B0.07998X         | 03380 5-7 CM     | SAM   | SOIL   | 09/09/2010        | 09/17/2010       |
| B0.07999Y         | 03381 5-7 CM     | SAM   | SOIL   | 09/09/2010        | 09/17/2010       |
| B0.08000U         | 03045 5-7 CM     | SAM   | SOIL   | 09/09/2010        | 09/17/2010       |
| B0.08001V         | 03046 5-7 CM     | SAM   | SOIL   | 09/09/2010        | 09/17/2010       |
| B0.08002W         | 03047 5-7 CM     | SAM   | SOIL   | 09/09/2010        | 09/17/2010       |

#### **EXCEPTIONS**

- 1. Packaging and Shipping No problems were observed.
- 2. Documentation No problems were observed.
- 3. Sample Preparation No problems were encountered.
- 4. Analysis Sample B0.08001 had a yield that was below NAREL acceptance criteria on the original analysis. The sample was reanalyzed. This reanalysis was recounted to verify the result.
- 5. Holding Times All holding times were met.

#### **QUALITY CONTROL**

- 1. QC samples All QC analysis results met NAREL acceptance criteria.
- 2. Yields All chemical yields were within acceptance limits.
- 3. Instruments Response and background checks for all instruments used in these analyses met NAREL acceptance criteria.



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Original

#### **CERTIFICATION**

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.

Mary F. Wisdom

Date

Quality Assurance Manager, NAREL

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Director, Center for Environmental Radioanalytical

Laboratory Science

#### **GENERAL INFORMATION**

#### SAMPLE TYPES

BLD Blind sample FBK Field blank SAM Normal sample

#### ANALYSIS QC TYPES

ANA Normal analysis
DUP Laboratory duplicate
LCS Laboratory control say

LCS Laboratory control sample (blank spike)

MS Matrix spike

MSD Matrix spike duplicate

RBK Method blank

#### **QUALITY INDICATORS**

RPD Relative Percent Difference

%R Percent Recovery

Z Number of standard deviations by which a QC measurement differs from the expected value

#### **EVALUATION OF QC ANALYSES**

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "Z scores." A Z score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The Z score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The Z score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the Z score is computed.

Each standard uncertainty used to compute a Z score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

#### SDG #1000029

#### **ANALYSIS SUMMARY**

Analysis Procedure:

NAREL AM-EICHROM

Title:

Actinides (Americium-241) by Extraction Chromatography

| NAREL Sample #  | QC<br>Type                              | Preparation Procedure | Date<br>Completed | Assay<br>Batch # | QC<br>Batch # |
|-----------------|---|-----------------------|-------------------|------------------|---------------|
| B0.07995U       | † • • • • • • • • • • • • • • • • • • • | N/A                   | 11/04/2010        | 0014537D         | 0007098Z      |
| B0.07996V       |   | N/A                   | 11/04/2010        | 0014537D         | 0007098Z      |
| B0.07997W       |   | N/A                   | 11/04/2010        | 0014537D         | 0007098Z      |
| B0.07998X       |   | N/A                   | 11/04/2010        | 0014537D         | 0007098Z      |
| B0.07999Y       |   | N/A                   | 11/04/2010        | 0014537D         | 0007098Z      |
| B0.08000U       |   | N/A                   | 11/04/2010        | 0014538E         | 0007098Z      |
| B0.08001V       |   | N/A                   | 11/11/2010        | 0014555F         | 0007135L      |
| B0.08001V       |   | N/A                   | 11/17/2010        | 0014565H         | 0007135L      |
| B0.08001V       | DUP                                     | N/A                   | 11/11/2010        | 0014555F         | 0007135L      |
| B0.08002W       |   | N/A                   | 11/04/2010        | 0014538E         | 0007098Z      |
| B0.08002W       | DUP                                     | N/A                   | 11/04/2010        | 0014538E         | 0007098Z      |
| LCS-00594032H * | LCS                                     | N/A                   | 11/04/2010        | 0014538E         | 0007098Z      |
| RBK-00594031G * | RBK                                     | N/A                   | 11/04/2010        | 0014537D         | 0007098Z      |
| LCS-00594861P*  | LCS                                     | N/A                   | 11/11/2010        | 0014555F         | 0007135L      |
| RBK-00594860N * | RBK                                     | N/A                   | 11/11/2010        | 0014555F         | 0007135L      |

<sup>\*</sup> Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

## PREPARATION METHOD(S) USED

| Procedure ID | Title |
|--------------|-------|
|              |       |

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#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.07995U

QC batch #:

0007098Z

Matrix: Sample type: SOIL SAM

Assay batch #:

0014537D N/A

Amount analyzed:

2.568e-01 GASH

Prep procedure: Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

81.83 %

Analyst:

**PMT** 

Ash/dry weight:

94.79 % N/A

QC type:

ANA

Sample description: Comment:

N/A

#### **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/03/2010 14:58 | 1000.0         | AS90        | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|-------------------|---------|----------|------------|
| Am241   | 7.42e-02 | 8.0e-02           | 9.1e-02 | PCI/GDRY | 11/03/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.07996V

QC batch #:

0007098Z

Matrix:

SOIL

Assay batch #:

0014537D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.554e-01 GASH

Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

87.60 % 91.54 % Analyst:

**PMT** 

Ash/dry weight:

N/A

QC type:

ANA

Sample description:

Comment: N/A

## **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/03/2010 14:58 | 1000.0         | AS91        | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|-------------------|---------|----------|------------|
| Am241   | 2.30e-02 | 6.3e-02           | 1.1e-01 | PCI/GDRY | 11/03/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.07997W

QC batch #:

0007098Z

Matrix:

SOIL

Assay batch #:

0014537D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.513e-01 GASH -

Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

87.60 %

Analyst:

**PMT** 

Ash/dry weight:

95.88 %

QC type:

ANA

Sample description: Comment:

N/A N/A

#### **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/03/2010 14:58 | 1000.0         | AS92        | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|-------------------|---------|----------|------------|
| Am241   | 1.08e-01 | 9.7e-02           | 7.8e-02 | PCI/GDRY | 11/03/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.07998X

QC batch #:

0007098Z

Matrix:

Comment:

SOIL

Assay batch #:

0014537D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.551e-01 GASH

Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

87.98 %

Analyst:

PMT

Ash/dry weight:

91.93 %

QC type:

ANA

Sample description:

N/A N/A

## **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/03/2010 14:58 | 1000.0         | AS93        | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|-------------------|---------|----------|------------|
| Am241   | 5.05e-02 | 7.8e-02           | 1.1e-01 | PCI/GDRY | 11/03/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.07999Y

QC batch #:

0007098Z

Matrix:

SOIL

Assay batch #:

0014537D

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.511e-01 GASH

Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

79.17 %

Analyst: QC type: PMT ANA

Ash/dry weight: Sample description: 84.96 %

N/A

Comment:

N/A

#### **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/03/2010 14:58 | 1000.0         | AS94        | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|-------------------|---------|----------|------------|
| Am241   | 9.46e-02 | 8.5e-02           | 6.8e-02 | PCI/GDRY | 11/03/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.08000U

QC batch #:

0007098Z

Matrix:

SOIL

Assay batch #:

0014538E

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.581e-01 GASH

Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

77.42 %

Analyst:

**PMT** 

Ash/dry weight:

87.80 %

QC type:

ANA

Sample description: Comment:

N/A N/A

## **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/03/2010 14:58 | 1000.0         | AS97        | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|-------------------|---------|----------|------------|
| Am241   | 7.38e-02 | 1.0e-01           | 1.6e-01 | PCI/GDRY | 11/03/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.08001V

QC batch #:

0007135L

Matrix:

SOIL

Assay batch #:

0014555F

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

1.251e-01 GASH

Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

79.44 %

Analyst:

**PMT** 

Ash/dry weight:

84.28 %

QC type:

ANA

Sample description: Comment:

N/A N/A

#### **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/10/2010 15:40 | 1000.0         | AS97        | DPG      |

| Analyte | Activity | ±2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|------------------|---------|----------|------------|
| Am241   | 1.47e-01 | 1.7e-01          | 2.4e-01 | PCI/GDRY | 11/10/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.08001V

QC batch #:

0007135L

Matrix: Sample type:

Comment:

SOIL SAM Assay batch #:

0014565H N/A

Amount analyzed:

1.251e-01 GASH

Prep procedure: Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

79.44 %

Analyst:

PMT

Ash/dry weight:

84.28 %

QC type:

ANA

Sample description:

N/A N/A

#### **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/16/2010 16:00 | 1000.0         | AS90        | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|-------------------|---------|----------|------------|
| Am241   | 2.03e-01 | 1.8e-01           | 1.7e-01 | PCI/GDRY | 11/16/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.08001V

QC batch #:

0007135L

Matrix:

SOIL

Assay batch #:

0014555F

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

1.251e-01 GASH

Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

79.44 % 84.28 % Analyst: QC type: **PMT** DUP

Ash/dry weight: Sample description:

N/A

Comment:

N/A

#### **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/10/2010 15:40 | 1000.0         | AS98        | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|-------------------|---------|----------|------------|
| Am241   | 3.22e-02 | 1.2e-01           | 2.3e-01 | PCI/GDRY | 11/10/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.08002W

QC batch #:

0007098Z

Matrix:

Comment:

SOIL

Assay batch #:

0014538E

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed:

2.541e-01 GASH 79.50 %

Analysis procedure: Analyst:

NAREL AM-EICHROM **PMT** 

Dry/wet weight:

93.27 %

QC type:

ANA

Ash/dry weight: Sample description:

N/A N/A

## **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/03/2010 14:58 | 1000.0         | AS99        | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|-------------------|---------|----------|------------|
| Am241   | 6.63e-02 | 9.2e-02           | 1.3e-01 | PCI/GDRY | 11/03/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

B0.08002W

QC batch #:

0007098Z

Matrix:

SOIL

Assay batch #:

0014538E

Sample type:

SAM

Prep procedure:

N/A

Amount analyzed: Dry/wet weight:

2.575e-01 GASH

Analysis procedure: Analyst:

NAREL AM-EICHROM **PMT** 

79.50 % 93.27 %

QC type:

**DUP** 

Ash/dry weight: Sample description:

N/A

Comment:

N/A

#### **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/03/2010 14:58 | 1000.0         | AS100       | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit     | Date       |
|---------|----------|-------------------|---------|----------|------------|
| Am241   | 1.45e-01 | 1.4e-01           | 1.5e-01 | PCI/GDRY | 11/03/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

LCS-00594032H

QC batch #:

0007098Z

Matrix:

N/A

Assay batch #:

0014538E

Sample type:

N/A

Prep procedure:

N/A

Amount analyzed:

1.000e+00 SAMP

Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

N/A

Analyst: QC type: **PMT** LCS

Ash/dry weight: Sample description: N/A N/A

Comment:

N/A

#### **COUNTING INFORMATION**

| Date and time Duration (11 |                  | Duration (min) | Detector ID | Operator |
|----------------------------|------------------|----------------|-------------|----------|
|                            | 11/03/2010 14:58 | 1000.0         | AS101       | DPG      |

| Analyte | Activity | ±2 σ Uncertainty | MDC     | Unit | Date       |
|---------|----------|------------------|---------|------|------------|
| Am241   | 2.10e+00 | 3.0e-01          | 4.4e-02 | PCI  | 11/03/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

RBK-00594031G

OC batch #:

0007098Z

Matrix:

N/A

Assay batch #:

00076362 0014537D

Sample type:

N/A

Prep procedure:

N/A

Amount analyzed:

1.000e+00 SAMP

Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

N/A

Analyst: QC type: PMT RBK

Ash/dry weight: Sample description: N/A N/A

Comment:

N/A

#### **COUNTING INFORMATION**

| Date and time Duration (min) |                  | Detector ID | Operator |     |
|------------------------------|------------------|-------------|----------|-----|
|                              | 11/03/2010 14:58 | 1000.0      | AS96     | DPG |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit | Date       |
|---------|----------|-------------------|---------|------|------------|
| Am241   | 3.62e-03 | 1.6e-02           | 3.1e-02 | PCI  | 11/03/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

LCS-00594861P

QC batch #:

0007135L

Matrix:

N/A

Assay batch #:

0014555F

Sample type:

N/A

Prep procedure:

N/A

Amount analyzed:

1.000e+00 SAMP

Analysis procedure:

NAREL AM-EICHROM

Dry/wet weight:

N/A

Analyst:

**PMT** 

Ash/dry weight:

N/A N/A

QC type:

LCS

Sample description:

Comment: N/A

#### **COUNTING INFORMATION**

|   | Date and time Duration (min) |        | Detector ID | Operator |  |
|---|------------------------------|--------|-------------|----------|--|
| Γ | 11/10/2010 15:40             | 1000.0 | AS99        | DPG      |  |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit | Date       |
|---------|----------|-------------------|---------|------|------------|
| Am241   | 1.97e+00 | 2.6e-01           | 2.9e-02 | PCI  | 11/10/2010 |

#### SDG #1000029

#### SAMPLE ANALYSIS REPORT

Sample #:

RBK-00594860N

QC batch #:

0007135L

Matrix:

N/A

Assay batch #:

0014555F

Sample type:

N/A

Prep procedure:

N/A

Amount analyzed: Dry/wet weight:

1.000e+00 SAMP

Analysis procedure:

NAREL AM-EICHROM

N/A

Analyst: QC type: **PMT RBK** 

Ash/dry weight: Sample description: N/A N/A

Comment: N/A

#### **COUNTING INFORMATION**

| Date and time    | Duration (min) | Detector ID | Operator |
|------------------|----------------|-------------|----------|
| 11/10/2010 15:40 | 1000.0         | AS100       | DPG      |

| Analyte | Activity | ± 2 σ Uncertainty | MDC     | Unit | Date       |
|---------|----------|-------------------|---------|------|------------|
| Am241   | 1.75e-02 | 2.2e-02           | 2.7e-02 | PCI  | 11/10/2010 |

#### SDG 1000029

## **QC BATCH SUMMARY**

QC batch #:

0007098Z

Preparation procedure:

N/A

Analysis procedure:

NAREL AM-EICHROM

| NAREL Sample #  | QC<br>Type | Yield (%) | ± 2 σ Uncertainty (%) | Analyst |
|-----------------|------------|-----------|-----------------------|---------|
| B0.07995U       |            | 91.28 %   | 8.57 %                | PMT     |
| B0.07996V       | [          | 84.66 %   | 8.32 %                | PMT     |
| B0.07997W       |            | 82.86 %   | 8.09 %                | PMT     |
| B0.07998X       |            | 79.08 %   | 8.08 %                | PMT     |
| B0.07999Y       |            | 91.35 %   | 8.88 %                | РМТ     |
| B0.08000U       |            | 69.77 %   | 7.50 %                | PMT     |
| B0.08002W       |            | 76.39 %   | 7.91 %                | РМТ     |
| B0.08002W       | DUP        | 57.87 %   | 6.72 %                | PMT     |
| LCS-00594032H * | LCS        | 75.61 %   | 7.80 %                | PMT     |
| RBK-00594031G * | RBK        | 74.24 %   | 7.68 %                | PMT     |

<sup>\*</sup> Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

#### SDG 1000029

## **QC BATCH SUMMARY**

QC batch #:

0007135L

Preparation procedure:

N/A

Analysis procedure:

NAREL AM-EICHROM .

| NAREL Sample #  | QC<br>Type | Yield (%) | ± 2 σ Uncertainty (%) | Analyst |
|-----------------|------------|-----------|-----------------------|---------|
| B0.08001V       |            | 88.54 %   | 8.60 %                | PMT     |
| B0.08001V       |            | 87.13 %   | 8.34 %                | PMT     |
| B0.08001V       | DUP        | 84.54 %   | 8.30 %                | PMT     |
| LCS-00594861P * | LCS        | 92.63 %   | 8.85 %                | PMT     |
| RBK-00594860N * | RBK        | 85.90 %   | 8.42 %                | PMT     |

<sup>\*</sup> Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

## National Air and Radiation Environmental Laboratory QC Batch Report

QC Batch #: 0007098Z

Analytical Procedure: NAREL AM-EICHROM

#### METHOD BLANKS (PCI)

| Sample ID | Nuclide | Activity ± 2σ      | Prep Date  | Flags |
|-----------|---------|--------------------|------------|-------|
| 00594031G | AM241   | 3.62e-03 ± 1.6e-02 | 2010-10-26 | OK    |

#### LABORATORY DUPLICATES (PCI/GASH)

| Sample ID | Nuclide | Original ± 2σ      | Duplicate ± 2σ     | RPD   | 2.      |
|-----------|---------|--------------------|--------------------|-------|---------|
| B0.08002W | AM241   | 7.11e-02 ± 9.9e-02 | 1.56e-01 ± 1.5e-01 | 74.65 | 0.95 OK |

#### LAB CONTROL SAMPLES (PCI)

| Sample ID | Nuclide | Amt Added ± 2 $\sigma$ | Measured ± 2σ      | %R     | Ż       |
|-----------|---------|------------------------|--------------------|--------|---------|
| 00594032н | AM241   | 2.08e+00 ± 2.2%        | 2.10e+00 ± 3.0e-01 | 101.20 | 0.17 OK |

Analvst:

taulo Tlento

11/5/10

1/1/

. [...

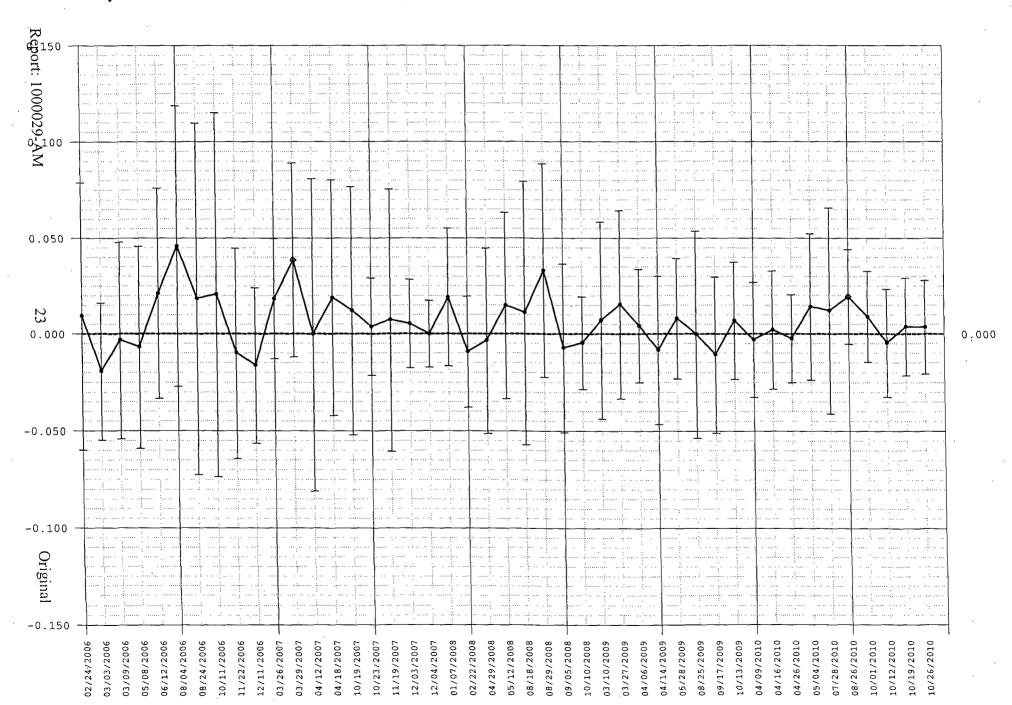
11/8/10

Method Blanks

Analyte: AM241

Method: NAREL AM-EICHROM

Analyst: Thaxton, Paula M.



## National Air and Radiation Environmental Laboratory QC Batch Report

QC Batch #: 0007135L

Analytical Procedure: NAREL AM-EICHROM

#### METHOD BLANKS (PCI)

| S | Sample ID | Nuclide | Activity ± 2σ      | Prep Date  | Flags |
|---|-----------|---------|--------------------|------------|-------|
| 0 | 0594860N  | AM241   | 1.75e-02 ± 2.2e-02 | 2010-11-09 | OK    |

#### LABORATORY DUPLICATES (PCI/GASH)

| Sample ID | Nuclide | Original ± 2σ      | Duplicate ± 2σ     | RPD    | Z        |
|-----------|---------|--------------------|--------------------|--------|----------|
| B0.08001V | AM241   | 1.74e-01 ± 2.1e-01 | 3.83e-02 ± 1.4e-01 | 127.91 | -1.09 OK |

#### LAB CONTROL SAMPLES (PCI)

| Sample ID | Nuclide | Amt Added ± 2 $\sigma$ | Measured ± 2σ      | %R    | Z        |
|-----------|---------|------------------------|--------------------|-------|----------|
| 00594861P | AM241   | 2.08e+00 ± 2.2%        | 1.97e+00 ± 2.6e-01 | 94.77 | -0.83 OK |

Analyst:

Paule Nex don

11/17/13

Thaxton, Paula M.

OA Officer:

11/17/10

Method Blanks

Analyte: AM241

Method: NAREL AM-EICHROM

Analyst: Thaxton, Paula M.

